



### 产品特性 Product features

- 抗冲击性能出色的自润滑材料。作为一种耐冲击的材料被用于需要吸震和耐磨的场合
- 连续使用温度: -40°C/+80°C
- 承受较高的载荷, 耐冲压
- 经济性强
- 干运行、免维护
- 承受边缘载荷
- 适合低速运动
- An excellent self-lubricated material suitable for impact resistance applications which is widely used under the environment of impact absorbing and wear resistance requirement
- Continuous working temperature: -40°C/+80°C
- High load capacity, Impact resistance
- Low cost
- Dry operation and maintenance free
- Good for Marginal Load
- Suitable for low speed operation

● 标准产品规格表 Standard specifications: P138

### 材料数据表 Material properties data table

材料性能 Material properties	测试标准 Standard	单位 Unit	CSB-EPB3M
颜色 Color	-	-	深灰 Dark grey
密度 Density	ISO1183	g/cm <sup>3</sup>	1.14
最大吸湿率 Max. moisture absorption, 50%RH	ISO62	%	1.4
最大吸水率 Max. water absorption	ISO62	%	7.6
对钢动摩擦系数 Coefficient of sliding friction(steel)	ITS025	μ	0.09-0.30
极限PV值 Max. PV value	ITS026	N/mm <sup>2</sup> × m/s	0.15
弯曲模量 Flexural modulus	ISO178	MPa	2700
弯曲强度 Flexural strength	ISO178	MPa	100
最大静载荷 Max. static load	ITS027	MPa	30
最大动载荷 Max. dynamic load	ITS028	MPa	15
邵氏硬度 Shore hardness	ISO868	D	79
连续运行温度 Long-term application temperature	ITS029	°C	+80
短时运行温度 Short-term application temperature	ITS029	°C	+170
最低运行温度 Lowest application temperature	ITS029	°C	-40
导热性 Thermal conductivity	ISO22007	W/m/K	0.24
线性热膨胀系数 Coefficient of thermal expansion	ISO11359	K <sup>-1</sup> × 10 <sup>-5</sup>	10
阻燃等级 Flammability	UL94	Class	HB
体电阻率 Volume resistance	IEC60093	Ω · cm	>10 <sup>12</sup>
面电阻率 Surface resistance	IEC60093	Ω	>10 <sup>11</sup>

\*ITS: CSB内部测试标准 CSB company's internal test standards.

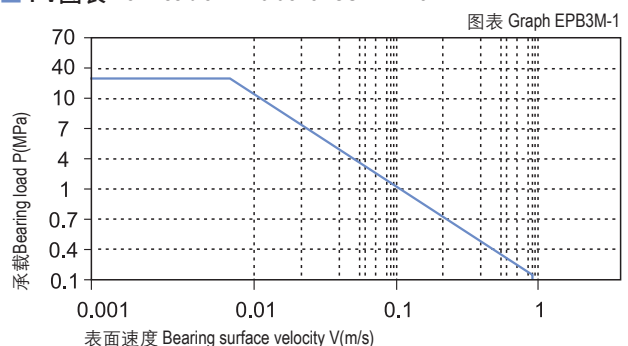
\*\*除非特殊说明测试温度为23°C Test temperatures are 23°C unless otherwise stated.

### 轴承PV值 PV value

CSB-EPB3M塑料轴承最大运行PV值为0.15N/mm<sup>2</sup> × m/s; 由此决定轴承所承受的载荷与速度成反比, 详细查阅图表EPB3M-1。

The max PV value of the CSB-EPB3M plastic bearings is 0.15N/mm<sup>2</sup> × m/s which determines the load capacity of bearing is inversely proportional to the speed. Please refer to the chart for more detailed information (Graph EPB3M-1).

■ PV图表 Permissible PV value for CSB-EPB3M



### 轴承的载荷、速度、温度 Load, speed and temperature

CSB-EPB3M塑料轴承可承受最大静载荷为30Mpa，在此载荷下轴承的最大压缩变形量参考图表EPB3M-2，轴承实际工作载荷略小于30Mpa，载荷还受到运行速度以及温度的影响，速度越快 (Vmax: 0.8m/s) 会导致摩擦温度上升，而温度上升 (Tmax: 80℃) 会导致轴承的承载能力逐渐减弱，载荷随轴承工作温度变化情况参考图表EPB3M-3。

CSB-EPB3M allows the Max static load of 30Mpa, The max compressive deformation rate under the max load is listed in Graph EPB3M-2, The actual load capacity of bearing is slightly less than 30Mpa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 0.8m/s) results into higher temperature (Tmax: 80℃) which decreases the load capacity of the bearing. Please refer to the Graph EPB3M-3 for such variation.

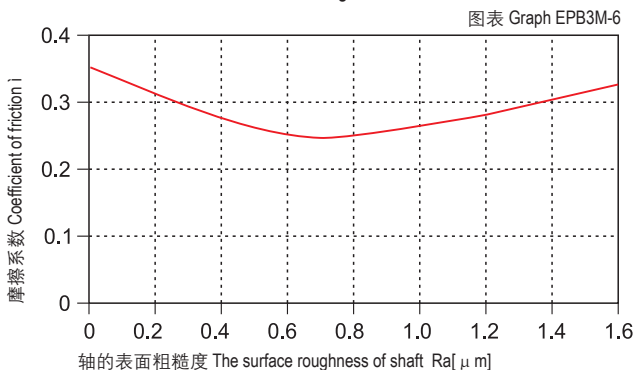
### 轴承的摩擦系数、磨损、轴材料 Friction factor, wear and shaft material

#### 摩擦系数 Friction factor

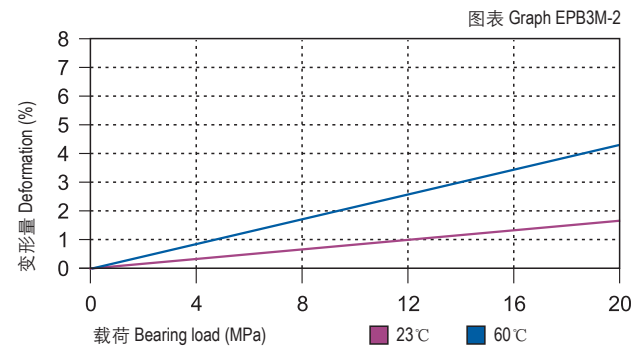
图表EPB3M-4表明CSB-EPB3M塑料轴承的摩擦系数在载荷一定的情况下随着速度的增加而快速升高，这就说明此轴承比较适合用于低速场合；图表EPB3M-5表明CSB-EPB3M塑料轴承在速度一定的情况下摩擦系数随着载荷的增加而逐渐降低。滑动轴承的摩擦系数和磨损受对磨轴表面粗糙度影响比较大，图表EPB3M-6表明CSB-EPB3M塑料轴承在表面粗糙度为Ra=0.6um轴上运行时可以获得更佳运行效果。

CSB-EPB3M Bearing Friction factor is increased along with the increasing of the operation speed (See Graph EPB3M-4) therefore it is suitable for the application under low speed operation. The friction factor of CSB-EP3M is decreased along with the loading increasing (see Graph EPB3M-5). The friction factor and wearing of the bearing is considerably affected by the counter shaft roughness. The Graph EPB3M-6 shows that the bearing could achieve its best performance when the counter shaft surface roughness is around Ra0.6.

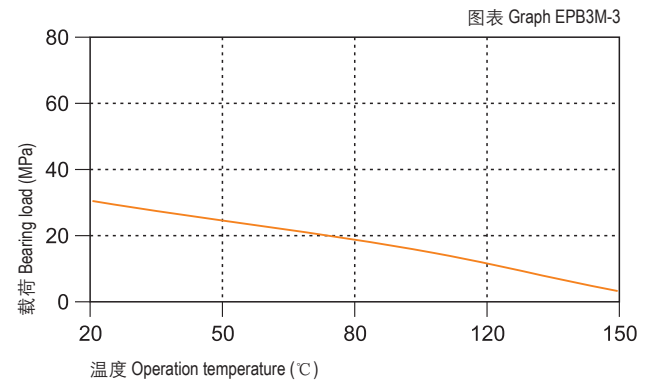
#### 摩擦系数与轴表面粗糙度关系图表 Coefficient of friction & the surface roughness of shaft



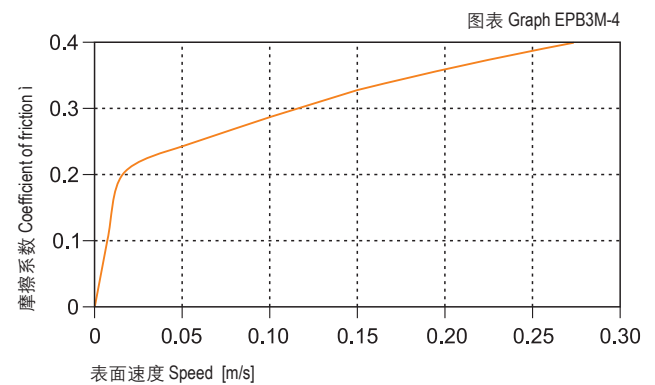
#### 载荷-温度-变形量图表 Load-Temperature deformation



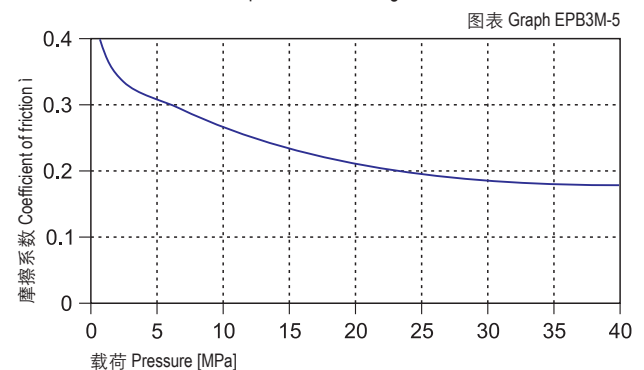
#### 载荷-温度图表 Load-Temperature diagrams



#### 摩擦系数与速度变化关系图表 P=2MPa Coefficient of friction & the speed of bearing, p = 2 MPa



#### 摩擦系数与载荷变化关系图表 v=0.2m/s Coefficient of friction & the pressure of bearing, v = 0.2 m/s



CSB-EPB3M	干运行 Dry	油脂 Grease	油 Oil	水 Water
摩擦系数 $\mu$ Friction coef.	0.09~0.30	0.09	0.04	0.04

### 磨损与轴材料 Wearing and shaft material

图表EPB3M-7表明CSB-EPB3M塑料轴承在不同轴材料上的运行效果表明此轴承在载荷超过2Mpa且做旋转运动时与轴材料的关系相对较小，由此图可以看出在低载荷时CSB-EPB3M塑料轴承运行效果较好。当轴承的载荷增加时，轴承的磨损会快速上升；由图表EPB3M-8可以看出在高载荷时CSB-EPB3M塑料轴承比较适合用于硬铬轴上运行。图表EPB3M-7表明CSB-EPB3M塑料轴承在用于旋转运动时的性能要明显优越于摆动运动。

Test of the bearing against various shaft materials shows that the material CSB-EPB3M features the wearing performance of the material is not sensitive with different materials where the loading is over 2Mpa. (See Graph EPB3M-7). The bearing performance remains the best when the loading is in the lower range. When the loading is increased, the wearing will be sharply increased. From the Graph EPB3M-8, the CSB-EPB3M material is better for the application with the counter shaft material of hard chrome steel. Graph EPB3M-7 shows that the material is better for rotation operation than oscillation operation.

### 化学抗性 Chemical resistance

CSB-EPB3M塑料轴承能抵抗弱碱以及各类润滑油的腐蚀。CSB-EPB3M is good at chemical resistance against weak acidic medium and various kinds of lubricants.

### 吸水性 Water absorption

CSB-EPB3M塑料轴承在标准大气中的吸湿率为1.4%。浸泡在水中最高吸水率为7.6%。由于高吸水率的特性，我们必须考虑此轴承的应用环境。

The moisture absorption of CSB-EPB3M plastic plain bearings is 1.4% in standard atmosphere. The max. water absorption is 7.6% in water. The application environment has to be considered due to the high water absorption properties.

### 抗UV性能 UV resistance

CSB-EPB3M塑料轴承长久暴露在紫外线下颜色基本不会改变。材料性能基本都不会发生改变。

CSB-EPB3M can maintain its color unchanged when it is exposed into the UV ray. The material performance stays stable.

### 安装公差 Installation tolerances

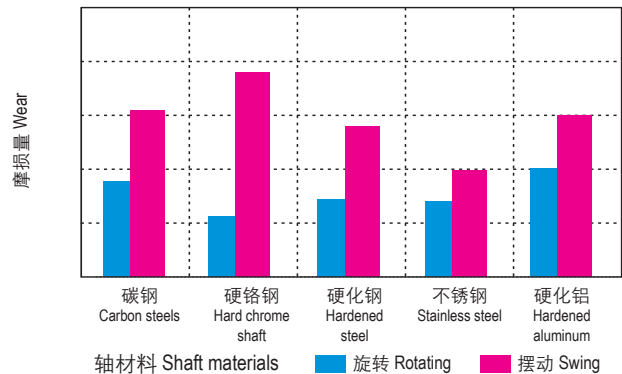
CSB-EPB3M塑料轴承压装后公差 Tolerances after pressfit

直径 Di. [mm]	CSB-EPB3M D11 [mm]	座孔 Housing H7 [mm]	轴 Shaft h9 [mm]
>0 ~ 3	+0.020 ~ +0.080	0 ~ +0.010	0 ~ -0.025
>3 ~ 6	+0.030 ~ +0.105	0 ~ +0.012	0 ~ -0.030
>6 ~ 10	+0.040 ~ +0.130	0 ~ +0.015	0 ~ -0.036
>10 ~ 18	+0.050 ~ +0.160	0 ~ +0.018	0 ~ -0.043
>18 ~ 30	+0.065 ~ +0.195	0 ~ +0.021	0 ~ -0.052

### 在不同轴材料上旋转时的磨损量 $p=2\text{MPa}$ , $v=0.2\text{m/s}$

Wear under rotating with different shaft materials,  $p = 2 \text{ MPa}$ ,  $v = 0.2 \text{ m/s}$

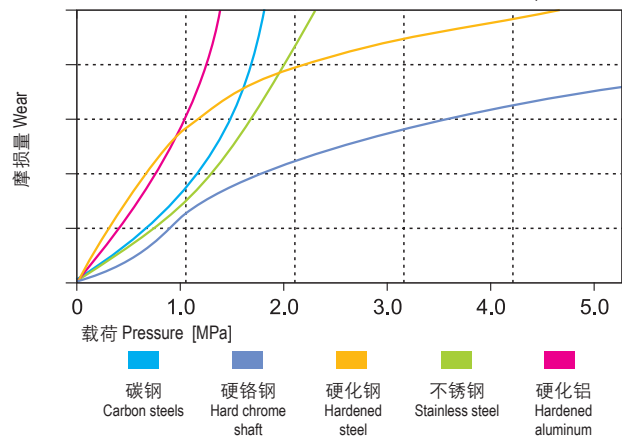
图表 Graph EPB3M-7



### 旋转磨损随轴材料与压力变化关系 $v=0.2\text{m/s}$

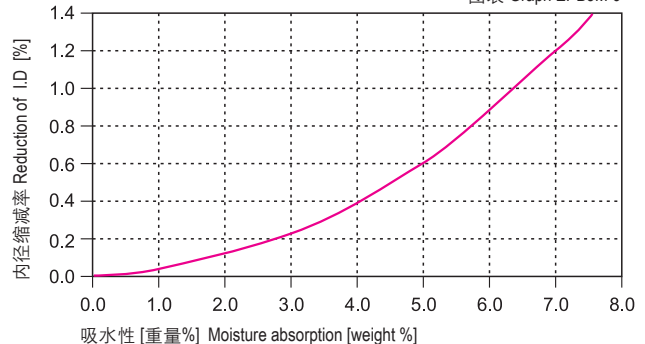
Wear & pressure under rotating with different shaft materials,  $v = 0.2 \text{ m/s}$

图表 Graph EPB3M-8



### 吸水性的影响 Effect of moisture absorption on EPB3M bearings

图表 Graph EPB3M-9



直径 Di. [mm]	CSB-EPB3M D11 [mm]	座孔 Housing H7 [mm]	轴 Shaft h9 [mm]
>30 ~ 50	+0.080 ~ +0.240	0 ~ +0.025	0 ~ -0.062
>50 ~ 80	+0.100 ~ +0.290	0 ~ +0.030	0 ~ -0.074
>80 ~ 120	+0.120 ~ +0.340	0 ~ +0.035	0 ~ -0.087
>120 ~ 180	+0.145 ~ +0.395	0 ~ +0.040	0 ~ -0.100